Results: Cell viability was significantly decreased in the H/R group in comparison to the control group ($P<0.01$), while cell viability obviously increased in the lycopene+H/R group compared to the H/R group ($P<0.01$). In the H/R group, the ratio of TUNEL-positive cardiomyocytes and Caspase-3 activity significantly increased compared to the control group ($P<0.01$), while the caspase-3 activity and TUNEL-positive cardiomyocytes ratio partly decreased in lycopene+H/R group. The expressions of GRP78 and CHOP apparently up-regulated in H/R group compared to the control group ($P<0.01$), while lycopene could decrease the expression of GRP78 and CHOP that induced by H/R exposure ($P<0.05$).
Conclusions: ER stress is associated with cell viability decreasing and cardiomyocytes apoptosis induced by H/R. Lycopene could effiently protect cardiomyocytes from H/R-injury via attenuating ER stress and ERS associated apoptosis.

GW25-e1549

Effects of apocynin and allopurinol on exercise training-upregulated NOS in the kidney of SHR

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Objectives: It has been recently reported that the exercise training (Ex) increases nitric oxide (NO) production and NO synthase (NOS) expression not only in vasculatures but also in the kidney of spontaneously hypertensive rats (SHR) with the reduction of systemic blood pressure. H2O2, which is metabolized by extracelluar SOD (ecSOD) increased the eNOS expression in the vascular endothelium by exercise training. However, the mechanisms of antihypertensive and renal-protective effects of Ex are not entirely understood.To clarify the mechanism of the Ex-increased NOS expression, the impacts of inhibitors of NADPH oxidase and xanthine oxidase on the Ex-increased NOS activity and expression were examined in SHRs.
Methods: Five week-old, male SHRs were trained with treadmill running. Apocynin (2 mmol/L in drinking water), an inhibitor of NADPH oxidase or allopurinol (1.5 mmol/L in drinking water), an inhibitor of xanthine oxidase was given for drug treatments. After 8 weeks, NADPH oxidase activity was measured by lucigenin luminescence. H2O2 and NO2/NO3 (NOx) in plasma and urine were measured by Amplex Red kit or Nitrate/Nitrite Colorimetric Assay Kit (Cayman chemical). The NOS activity and expression were examined in the kidney cortex, the outer medulla, the inner medulla and thoracic aorta.

Date are presented as the means±SEM. The significance of differences in mean values was evaluated using ANOVA and values of $P<0.05$ were considered to indicate statistical significance.
Results: The Ex significantly increased NADPH oxidase activity in the kidney cortex (by 26%), the outer medulla (by 29%) and thoracic aorta (by 32%). Apocynin blocked the Ex-induced changes, but allopurinol had no effects on them. The Ex significantly increased H_2O_2 (plasma: by 22%, urine: by 26%) and NOx (plasma: by 14%, urine: by 23%) in plasma and urine, NOS activity (by 34%) and endothelial and neuronal NOS (eNOS and nNOS) expressions in the kidney cortex (eNOS:25%, nNOS:24%), the outer medulla (eNOS:24%, nNOS:23%), the inner medulla (eNOS:21%, nNOS:22%) and thoracic aorta (eNOS:20%, nNOS:18%). Apocynin significantly decreased these of SHR. Apocynin blocked the Ex-induced changes of aortic NOS activity and expression, but allopurinol blocked the Ex-induced changes of H_2O_2 and NOx levels and renal NOS expression.
Conclusions: These results indicate that the Ex-increased NOS activity and expression in aorta were mediated through NADPH oxidase, but in the kidney were mediated through xanthine oxidase in SHR.

GW25-e4221

Study on protective mechanism of DBZ on homocysteine induced bone marrow mesenchymal stem cells damage

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Objectives: To investigate the effects of DBZ on the proliferation of bone marrow mesenchymal stem cells, and the protective effect and mechanism of DBZ on homocysteine induced BMSCs damage.
Methods: Density gradient centrifugation and adherent cell culture method for isolation and culture of rat BMSCs, to identify the cell surface markers by flow cytometry; MTT assay to detect cell proliferation activity; The T-SOD activity and MDA concentration of cells was measured by anthineoxidase method and TBA method, to evaluate cell oxidative and antioxidative ability; To observe the ultrastructure of cells under transmission electron microscope; To detecte the expression level of Akt and NF- κ B of cells within the immunocytochemical method.
Results: Compared with the normal group, DBZ-1 and DBZ-2 (10umol/L) can improve the inhibition of Hcy on the proliferation of BMSCs, improve the ability of anti oxidative damage ($P<0.01$), and Akt/NF- κ B expression level was significantly increased ($P<0.01$), adding PI3K inhibitor LY294002, can weaken the promoting effect of DBZ on the expression of Akt/NF- κ B in BMSCs ($P<0.05$).
Conclusions: DBZ can promote the proliferation of BMSC, and improve the Hcy of BMSC injury, the mechanism may be related to activation of PI3K/Akt signal transduction and its downstream signal pathway of NF- κ B protein.

GW25-e0854

Atorvastatin Attenuates TNF-α-induced Increase of Glucose Oxidation Through PGC-1α Upregulation in cardiomyocytes

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Objectives: Recent studies have shown that atorvastain has anti-inflammatory effect and can prevent cardiac hypertrophy. The development of cardiac hypertrophy and dysfunction is associated with an increase in cardiac glucose utilization.
Methods: In this study, we investigated the effect of atorvastatin on glucose oxidation in tumour necrosis factor-α (TNF-α) -stimulated cardiomyocytes (H9c2 cells) and the potential role of peroxisome proliferation-activated receptor co-activator -1α (PGC-1α) in this effect.
Results: Exposure of H9c2 cells to TNF-α inhibited the expressions of PGC-1α, pyruvate dehydrogenase kinase 4 (PDK4), carnitine palmityl transferase 1 (CPT1) and induced a significant increase in glucose oxidation rate. However, these effects of TNF-α were significantly reversed by atorvastatin. Selective silence of PGC-1α in H9c2 cells resulted in the down-regulation of PDK4 and CPT1 and further increased the TNF-α-induced glucose oxidation. Interestingly, the effect of atorvastatin on PGC-1α was almost abolished by mevalonate and partially by farnesol, but not by geranylgeraniol.
Conclusions: In conclusion, atorvastatin inhibits TNF-α-induced glucose oxidation through PGC-1α up-regulation in cardiomyocytes, which might be associated with the regulation of isoprenoid metabolites.

GW25-e1124

Atorvastatin improve endothelial function of insulin resistance endothelial cells directly

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Objectives: To study the effect and the mechanisms of atorvastatin on endothelial function of insulin resistance endothelial cells.
Methods: To establish endothelial cells insulin resistance model, added different concentrations of atorvastatin in insulin resistance endothelial cells, from 10^{-2} atorvastatin group to 10^{-5} atorvastatin group for eight groups, negative control group (endothelial cells with 200μl normal medium) and model control group (insulin resistance endothelial cells without drugs). After 48h administration, using nitroreductase method for the determination of the content of nitric oxide, using radioimmunoassay for endothelin levels, using western blot to observe the expression of nitric oxide synthase and quantitative analysis.
Results: Compared with model control group, there was a significant difference on NO increasing in 10^{-3} atorvastatin group (110.68±1.74 umol/L to 37.04±3.54 umol/L) and ET-1 lowering (25.95±1.93 pmol/L to 89.75±3.62 pmol/L) after 48h atorvastatin admistration ($P<0.05$) ; atorvastatin significantly increased the intracellular eNOS content ($P<0.05$), the optimal concentration of atorvastatin statin was 10^{-3}mmol/L.
Conclusions: Atorvastatin directly improve endothelial function of insulin resistance endothelial cells significantly, the mechanism may be improving eNOS activity, leading to an increased of NO content and improving endothelial function.

GW25-e1557

Generation and Characterization of Induced Pluripotent Stem Cells from Human Fibroblast Cells

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Objectives: Induced pluriptent stem (IPS) cells have great potential for regenerative cardiac medicine, since it could serve as a source of regenerative cardiomyocytes due to their high potentials for self-renewal, proliferation, differentiation. Here we aimed to establish a method for reprogramming the human fibroblast cells into IPS cells.
Methods: After virus package in Plat-GP cells using platinum retrovirus expression system, BJ fibroblast cell line were infected with retrovirus vectors expressing four Yamanaka's factors (SOX2, OCT3/4, KLF4 and c-MYC) under ES cell culture conditions. IPS like colonies were picked up and expanded after three weeks. To identify the reprogrammed IPS cells, quantitative PCR, immunofluorescence and alkaline phosphotase (AP) staining were performed to detect the specific markers for IPS cells.
Results: 14 IPS colonies were picked up and established. They all have typical morphological characteristics represented by growing as compact, multicellular colonies and exhibiting a high nuclear-to-cytoplasm ratio and prominent nucleoli. Quantitative PCR results showed that the mRNA of OCT4 and NANOG were highly expressed. Red color stained colonies were showed by AP staining. The pluripotent markers were further determined by immunofluorescent results, represented by positive fluorescence signal of OCT4 restricted to the nuclei and strong signal of SSEA4 specifically located in the cell membrane.
Conclusions: Taken together, the method for generation of IPS cells from human somatic cells were successfully established and preliminarily confirmed. This will